PRESERVED

App. F. IX-4

Previous References 1935-6 (Inc)

File No. 207-35

Serial Nos. (3 to 4)

Letter References

GENERAL AND REVENUE SECRETARIAT.

Serial Nos. ~~Two.~~ ~~Three~~ 1 — 50

Part B for Nov' 38

SUBJECT

Manufacture of Sulphuric Acid and Chemical manures in the State

WD 0295—GPB—22,500—13-8-37

(1)

DEWAN'S MINUTE.

FILE No. 193

Dept.
3 AUG. 1935
No. 22.1.26.
546
GEN. & RAW MATERIALS
DEVELOPMENT BRANCH

Manufacture of Sulphanic acid

Mr was also idea of making for our Sulphanic acid. Has no proposal been dropped?

MJ
2-8-35.

Dev. Secy)

Mr is the present position

Secy I.D.C. Bombay

J.V.S.
3/8 —

2

MYSORE ECONOMIC CONFERENCE.

BOARD OF INDUSTRIES AND COMMERCE.

Subject ...Manufacture of Sulphuric acid.....

File No. of 19

8
5-8-35

DEWAN'S OFFICE
6 AUG. 1935
No.....C.O.9

Minutes of the Dewan regarding the manufacture of Sulphuric acid are submitted herewith for perusal.

* including Sri C.V. Raman & Mr Metcalfe

The Chemical Industries Sub-committee, at their meeting held on 31st July 1935, considered the manufacture of ammonium sulphate, Sulphuric acid and other sulphates and recommended that the scheme might be adopted. This subject has been included in the agenda for the meeting of the Board arranged to be held on 12th August 1935.

Flag E. not in file

* A Copy of the ~~meeting~~ proceedings of the meeting of the Chemical Industries Sub Committee is submitted herewith.

5/8/35

Chairman)

Dewan

6/8

6-8-35

submitted for information 7/8

8/8/35

9/8 (10/8)

Dew: Secretary)

NOTE—Contn. Sheet.

WD 921—GPB—1,500—26-9-28

May these papers be filed here or returned to the Bd

KO

10/8/38

PH.207-35-1

L.C.

D. 63

GEN. & REV. SECRETARIATS
10 AUG 1935

DEWAN'S MINUTE.

FILE No. 193

DE
10 AUG 1935
A.G.C.

Hon. Secy

Report regarding the scheme for the manufacture of Chemical manures in the State may be noted for His Highness's perusal.

MJ
9-8-35.

For perusal. A.D.F.N will be present

10.8.35.

Noted

10/8

DF.N

13/8

Fair draft

15.8.

Fair draft Subs as directed

17/8/35

19.8.

F.N. Signed by Members.

21/8

DSN

TYPING SECTION.
16 AUG. 1935
SECTT.

956
3/8/35

1063
9/8/35

1339
19/8

Manufacture of Chemical Manures

General and Revenue Secretariat. | File No. | of 193 | [App. F. III-2

C

1173
23/8/35

DEWAN'S OFFICE
23 AUG. 1935
No. 365

D.S.N Subd
22/8/35

Dewan
23/8

Dewan
23.8.
23/8

DMS
23-8-35

NOTE—Contn. Sheet.

Final Note by the First Member of Council. 6

Subject:—

Manufacture of chemical manures in the State.

I beg to submit herewith for the gracious perusal of His Highness a copy of the proceedings of the meeting of the Chemical Industries Sub Committee of the Board of Industries and Commerce regarding the manufacture of chemical manures in the State.

With the intensive cultivation of sugarcane in the Irwin Canal area, there is a certain demand for Ammonium Sulphate and the proposals made by the Sub Committee are well worth investigation. The question was considered by the Board of Industries and Commerce on the 12th instant when it was found that some of the data on which the financial results were based required further verification. For instance, it was stated that while the sale price of Ammonium Sulphate is taken at Rs.97-8-0 a ton, a year or two ago this commodity was being sold by the Imperial Chemical Industries Ltd. at about Rs.91. Further, the cost of charcoal at Mandya has been taken at Rs.20 a ton. This figure is unduly optimistic. Even at Bhadravati the cost of charcoal is about Rs.25 per ton. The scheme has been therefore remitted for further consideration to the Sub Committee which has been strengthened for this purpose by the addition of four members, viz., Messrs. B.K. Garudachar and M.L. Nagappa Chetty who have practical experience of the use of manure and its cost, the Director of Agriculture and the Chief Conservator of Forests.

Further action will be taken as soon as their report is received.

Bangalore,
21st August 1935.

MEMBER OF COUNCIL.

Submitted to His Highness.

I submit herewith a Final Note by the First *Member of Council on the subject of* the manufacture of chemical manures in the State, *for His Highness' gracious approval.*

Mirza M. Ismail

Dewan.

Bangalore,
23rd August 1935.

8

Record of Cases submitted for the Orders of His Highness the Maharaja.

Subject.

Manufacture of chemical manures in the State.

C Secy
Mg
30-8-35

No. 97

Rec
30/8

Order.

~~KRW~~
27/8/35

General and Revenue Secretariat

9 650 / H.A 110

SUBJECT:-

Manufacture of chemical manures in the State.

(*)

31. All urgent or confidential files returned with His Highness' orders may in the absence of instructions or indications to the contrary, be ordinarily circulated to the Members of Council for perusal after the issue of orders.

33. The Secretaries concerned should see that orders in the cases referred to above are issued at once and that the files are returned immediately after to the Chief Secretary for circulation to the Members.

34. In all other cases, the files will first be circulated to the Members of Council at Head-quarters and then sent to the Secretariat concerned for the issue of orders.

Circulated to Members of Council for perusal of His Highness' orders before/~~after~~ issue of orders. (*Vide* Rules 31, 33 and 34 of the Subsidiary Rules for the conduct of business of Council in the Manual of Council Rules and Procedure.)

Chief Secretary to Government.

Through the Secretary to Government,

Development Department.

30.8.35

1594
30/8

FIRST MEMBER OF COUNCIL. 30/8

SECOND MEMBER OF COUNCIL. (on tour outside the State)

Dear Lee, with Comps

NOTE.—Contn. sheet.

GEN. SECRETARIAT DEVELOPMENT BRANCH.

Sw B 4/9

3.9 3.9 3/9

Manufacture of Chemical Manures.

General and Revenue Secretariat — File No. 207 of 1935 — [App. F. III—2

Serial No.	
	Linked file
	Attention is invited to Resolution No. 8 of the Proceedings of the Bd of Industries dated 12.8.1935 referred in the draft final note on the Subject. It will take some time before the Subject is again dealt with by the Chemical Industries Sub Committee and the Board of Industries thereafter.
	This file will be kept in Suspense and a further report awaited till the end of Dec 1935.
	K.D. 12.10.35
	Sus A 7/2/36
	9/2

NOTE.—Contn. Sheet.

WD 03591—GPB—30,000—13-7-35

46 SV

9e. 207-35 (3)

Serial No.

GEN. & REV. SECRETARIAT
7 APR. 1936
DEVELOPMENT BRANCH
RECORD NUMBER OF GOVT.
4 APR. 1936

Sri Gurunath through

Some of the Calculations.

In my revised Calculations I am taking Sulphur at Rs 80/-. Mr. Warfield said, You remember that Factors are Setting it at Rs 78/-.

1.4.36

Mr. Venkatasaranacharya Esq.
Dev. Secy.

Subject for perusal
Will be placed in the connected file

9e 207-35
Submitted

7/4

7.4.36

Sri Subbiah 15/5
8.4.36

GEN. & REV. SECRETARIAT
8 APR. 1936
DEVELOPMENT BRANCH

NOTE.—Contn. Sheet.

WD 03694—GPB—30,000—13-7-35

T-O

5836

Sulphuric acid &
Manufacture of Ammonium Sulphate

(12

General & Revenue Secretariat. File No. 207 of 1935 [App. F. III–2

Serial No.

From Mr S.G. Sastri Dy. Director of Ind
Dis Letter No 5810 D 2.6.36
Forwards his views in regard to
the working of the Ammonium
Sulphate plant – six months
continuously & half-time the remaining
six months.
Mr Sastri says that he
has written to New York to
obtain the opinion of the
manufacturers of the plant on the
above point.
Submitted for perusal
Please put up the
previous file
6/6/36 Sec. 6.6.36
The previous file in the Branch
on the subject is sent
12/6/36 Sec'y 12.6.36
We may await further repn.
17.6.36.
15/6/36
Orders have issued separately sanctioning
the flotation of the Nagpur Chemicals &
Fertilizers Ltd.

GEN. & REV. SECRETARIAT
20 JUNE 1936
DEVELOPMENT BRANCH

NOTE—Contn. Sheet.

DEV: SEC'Y.

"C O P Y."

F. S. KERR & CO.,
Aniline Dyes and Chemicals

Vulcan House
Ballard Estate,
Bombay.

24th March 1936.

COL. WILLIAM WARFIELD.

S.G. Sastry, Esq., B.A., M.Sc., (Lond.),
Deputy-Director, Department of Industries
& Commerce, Government of Mysore, Bangalore.

Dear Mr. Sastry,

This is to confirm to you that we are willing to deliver all the equipment for an Ammonium Sulphate plant with a capacity of 20 tons per day, in accordance with the specifications dated Jany.30, 1936, items 1 to 57 inclusive, for approximate £ 511,000 (Rs.13,79,700). We would furnish all necessary equipment together with layout drawings showing how the equipment is to be erected with indications of piping and contour of buildings. Engineers to supervise the erection and initial starting of the plant would be furnished at an extra cost of £ 50.00 per diem plus expenses. The total cost of the plant as specified, we estimate at Rs.20,75,000.

These figures would be reduced by Rs.81,000, if the hydrogen is to be made from water gas instead of electrolysis. The revised figures include an acid plant capacity 5 tons in excess of the amount required for the sulphate.

The figure of Rs.13,79,700 is divided between the three parts of the plant approximately as follows:

Ammonia plant ...	Rs10,26,000
Sulphuric Acid Plant..	2,37,600
Ammonium Sulphate Plant.	1,16,100

We would be willing to quote you separately on either the Ammonia Plant or the Sulphuric Acid plant with or without the Ammonium Sulphate Plant. I believe, you will agree with me, however, that it would be desirable both from an economic and from an engineering point of view to have one company responsible for the entire plant.

In order to give you a basis on which to figure further details, I estimate roughly that in addition to the cost of equipment given in the above list, you would have to pay for buildings, field superintendents, erection, railway freight, etc. the following amounts:

Ammonia Plant. ...	Rs.4,18,500
Sulphuric Acid Plant.	93,420
Ammonium Sulphate Plant.	1,87,380

You

You asked me to obtain for you the shipping weights of the equipment for the entire plant, the quantities of material to be purchased locally, the tonnage of steel work for the buildings, and estimates covering such extra items as are not included in the prices given above, such as, workshop, pumps circulating water, spare parts etc. I am asking the office in New York to write to you directly in regard to these items.

I have a cable from New York, which informs me that in order to operate the proposed Sulphate of Ammonia plant on night power, in accordance with the design of plant contained in the proposal of January 30th, you would require 6,600 KW. continuously during the twelve hours and 400 KW. continuously during the day time. This figure might be reduced by using the Linde method of generating nitrogen. The additional cost of the equipment required would be Rs.5,04,400. The total cost of the plant would be increased by approximately Rs.6,90,000.

As we had anticipated in our discussion, it would be better to operate the electrolytic cells at reduced capacities during the day and full capacity at night. For instance, it might be possible to use 1,700 KW. during the day time and 5,000 K.W. during the night. This would add approximately half of the above figures to the cost of the equipment and the cost of the completed plant.

You can figure the saving on power for electrolysis by the formula $7H_2$ plus $3N_2$ plus $\frac{1}{2}O_2$ = $6H_2$ plus $3N_2$ plus H_2O. The Linde process for fractionation of liquid air required 0.25 KWH. per m3 of Nitrogen or about 910 KWH per day.

I have been informed that I will have to return to Calcutta and consequently will be in India for some time probably till the middle of April or even later. In writing to New-York about any of these matters, I suggest you send me a copy in c/o. F.S. Kerr & Company, Vulcan House, Ballard Estate, Bombay. I will keep in touch with Mr.Kerr, who will be able to forward me any information that you may send. If you wish to reach me personally in the meantime, you can do it by telegraph through Mr. Kerr.

Yours sincerely,

Sd. William Warfield.

atk-3)

Appendix F G—1]

SUBJECT .....

.....

.....

Section

File No.

Serial No.

Diary No. of letter replied to..... No. D 5560.

To

The Secy. Board of I. & C.

General and Revenue Secretariat

( )

the *193*

Subject. Manufacturing chemical manure.

Date of issue 11. 3. 36.

Sir,

I am directed to request you to state when a final report on the above subject may be expected in this office.

I have etc

Signed by Mr. K. S. A.

KP

for Dep. Secy to Govt.

Send with a Reminder

Issue KP 9.10.35

9.10.35

Send. The draft already put up and got Typed may be issued now. Approved.

List of enclosures 9/

11/3/36

Copied by Issued 10/3

Examined by.....

IRE·207-35

B. [A.C. 1.]

BOARD OF INDUSTRIES & COMMERCE

No. 704

Bangalore, dated 16th March 1936.

GEN. & REV. SECRETARIAT
DEVELOPMENT BRANCH

FROM H.K. Ramiengar, Esq., M.A.(Hons),
Secretary, Board of Industries and Commerce,
BANGALORE.

To

M. Venkatanaranappa, Esq.,B.A.,
Secretary to the Government of Mysore,
Development Department, Bangalore.

SIR,

Subject:- Manufacture of Chemical Manure.

With reference to your letter No. D. 5560 dated 10th March 1936 on the above subject, I am directed to state that the scheme for the manufacture of ammonium sulphate is being revised by the Deputy Director of Industries in the light of the observations made by the Chemical Industries Sub Committee. A reference has been made to Messrs. Ammonia Casale, Switzerland, for some more information and as soon as a reply is received from them further action will be taken to place the subject before the Board.

I have the honour to be,
Sir,
Your most obedient servant,

H.K. Ramiengar
Secretary.

GEN. & REV. SECRETARIAT
DEVELOPMENT BRANCH

S.G. Sastry, Esq., B.A., M.Sc., (Lond.) F.C.S.,
Deputy-Director of Industries & Commerce,
GOVERNMENT OF MYSORE

JLC.207-35 I.

ADDRESS FOR TELEGRAMS:
SANDAL
MYSORE
CODE USED: "BENTLEY'S"

No. 5810
Enc.

SANDALWOOD OIL FACTORY, JUNE 1936

Mysore, 2nd July 1936

Comp D 16

Dear Sir,

Subject:- The possibility of working the Ammonium-Sulphate-plant six months continuously and half-time the remaining six-months.

*****

If we should consider an output of 7,200 tons a year, the above suggestion would make it necessary to produce - 4,800 tons during the continuous period and 2,400 tons during the discontinuous period. For one thing the contemplated - plant should be one-third bigger at least to work according to the above plan; that means, extra capital investment. It also follows that at least half the number of skilled operatives will be unemployed during six months of the year. The charges for repairs and renewals will be greater under conditions of interrupted service than under continuous service. The life of the catalyst will be shorter when the process is worked discontinuously.

It has been stated that there will be no difficulty to work the electrolytic plant for only 12 hours at nights. If this system is adopted, I take it that we shall store an adequate supply of hydrogen and nitrogen in gas tanks (enough for 24 or 36 hours' use) and replenish the used up portion every night by working the electrolytic plant with the available night load of surplus electrical energy(off-peak-load).

But the real difficulty will be with the Ammonia-synthesis plant. This synthesis involves high temperature and pressure gas reactions in the presence of extremely sensitive catalysts. Whenever the plant is started, it will take a few hours to get the different sections of the correlated processes under proper control and get the reacting gases under equilibrium to give an optimum output, and when once the operating conditions are established, the process goes on without stoppage for days and months. This continuous operation is an essential factor for the success of the process. If it is to be interrupted every twelve hours, it may so happen that we may not get proper equilibrium conditions in the time at our disposal. The catalyst (working temperature 400°-500°C.)

6

will be subjected to unnecessary strain by alternate cooling and heating every 12 hours and will lose its sensitiveness very soon and will also sinter away very quickly. On the whole, the efficiency of the operation will be so low under the above conditions that it does not appear to be a sound idea either scientifically or economically.

I have written to New-York about this to-day to elicit the opinion of the manufacturers of the plant.

Yours sincerely,

S Bhatnagar

M. Venkatanaranappa, Esq., B.A.,
Secretary to Government,
Development Department,
Camp. Mysore.

SGS:ATK)

C.D. Priestley.

IMPERIAL CHEMICAL INDUSTRIES (INDIA), LTD.

SPRINGHAVEN ROAD (SOUTH),
THE HARBOUR,
MADRAS.

16th June 1936.

My dear Mr. Venkatanaranappa,

You promised to let me have details of the amount of surplus Sulphuric Acid that you wish to provide for in order to make the State independent upon outside sources. This figure of the State's requirements of Sulphuric Acid will most certainly materially affect the estimated figures at present being gone into, and I should be grateful if you would let me have this information with the least possible delay.

Yours sincerely,

C.D. Priestley

M. Venkatanaranappa, Esq.,
Secretary to Development.
Government of Mysore,
Bangalore.

C.D. Priestley.

IMPERIAL CHEMICAL INDUSTRIES (INDIA), LTD.

SPRINGHAVEN ROAD (SOUTH),
THE HARBOUR,
MADRAS.

(PERSONAL & URGENT).

15th July 1936.

My dear Mr. Venkatanaranappa,

In case you have not received it, I send a copy of a letter which I wrote to you on the 16th June, and to which as yet I have not received a reply.

It is important that I should know what surplus Sulphuric Acid is required for commercial purposes which you hope will make the State independent ~~upon~~ of outside sources, because I know that our report at Home is in an advanced stage as I have recently had to reply to one or two cable queries. Will you please let me know by return so that I can cable Home this information.

Yours sincerely,

C. Priestley

M. Venkatanaranappa, Esq.,
Secretary to Development,
Government of Mysore,
Bangalore.

[illegible]

Encl:

C.D. Priestley

COPY

FROM IMPERIAL CHEMICAL INDUSTRIES (INDIA) LIMITED
SPRINGHAVEN ROAD (SOUTH), THE HARBOUR
MADRAS

SHEET No.

DATE 16th June 1936.

To

My dear Mr. Venkatanaranappa,

You promised to let me have details of the amount of surplus Sulphuric Acid that you wish to provide for in order to make the State independent upon outside sources. This figure of the State's requirements of Sulphuric Acid will most certainly materially affect the estimated figures at present being gone into, and I should be grateful if you would let me have this information with the least possible delay.

Yours sincerely,

Sd/- C.D.Priestley.

M. Venkatanaranappa, Esq.,
Secretary to Development,
Government of Mysore,
Bangalore.

ALL OFFERS AND PRICES UNLESS STATED TO BE FIRM ARE WITHOUT ENGAGEMENT AND SUBJECT TO STOCKS BEING AVAILABLE.

D.D. no 12

16

16th July 1936.

Dear Mr. Priestley,

I am in receipt of your letter dated 15th instant and I am sorry there has been some delay in sending you the information required. The proposal under consideration is for the manufacture of the following quantities of sulphuric acid and chemicals:

Ammonium sulphate	7,200	tons	per	annum
Sulphuric acid	300	tons	"	"
Copper sulphate	300	"	"	"
Magnesium sulphate	100	"	"	"
Ferrous sulphate	100	"	"	"

This is the basis on which the scheme is being worked. You will doubtless make any alterations that may be necessary to suit the operation of the plant.

Yours sincerely,

C.D. Priestley, Esq.,
Imperial Chemical Industries (India),Ltd.,
Madras.

31 JULY 1936

C.D. Priestley.

IMPERIAL CHEMICAL INDUSTRIES (INDIA), LTD.

11 SPRINGHAVEN ROAD (SOUTH),
THE HARBOUR,
MADRAS.

DEWAN'S OFFICE
22 SEPT. 1936
No. 6.1.5.

OFFICE OF THE
SECOND MEMBER OF COUNCIL.
16 SEPT. 1936
NO. 1902

16/9/36

15th September 1936.

Dear Mr. Venkatanaranappa,

Thank you for your letter of yesterday and I can assure you that this matter has not been overlooked. Our Home friends had made sufficient progress to prepare a draft report which was ready in a rough form early in August.

Doubtless you are aware that I had arranged for the Dewan to meet our Home Directors, and he visited I.C.I. House on the 7th of August, where he had a talk with certain of our Directors and technical executives, and amongst other things, the Nitrogen scheme was discussed very fully.

It was finally agreed that I.C.I.'s report on the scheme would be sent to the Dewan at the earliest possible date before August 19th, when His Highness the Maharajah and party were due to leave England for the Continent. A copy of this report was going to be sent to us also, but as yet it has not been received by me, but I am writing to my Head Office in Calcutta today, enquiring whether they have yet received their copy. As soon as I am in a position to advise you further, I will write immediately.

Yours sincerely,

C. D. Priestley

M. Venkatanaranappa, Esq.,
Secretary - Development Department,
Government of Mysore,
Bangalore.

For perusal

MW. 16.9.36.

Herewith. Copies of the correspondence we have had with Messrs. Lees. Kindly submit a note for the perusal of the Dewan

MW 19/9/36

MW. 21.9.36.

19

FORM H.O/8.
FORM C.M. 78

IMPERIAL CHEMICAL INDUSTRIES LIMITED

TELEGRAMS:
IMPKEMIX, TELEX, LONDON.

TELEPHONE:
VICTORIA 4444.

Reply to be directed to the
F. M. C. Group
for the attention of

AEG/EMB

OVERSEAS SALES DEPARTMENT
~~FOREIGN MERCHANT COMPANIES GROUP.~~

MILLBANK,

LONDON, S.W.I.

18th August, 1936.

Amin-ul-Mulk Sir Mirza M. Ismail, C.I.E., O.B.E.,
Dewan of Mysore,
Dorchester Hotel,
London, W. 1.

Sir,

As promised at our discussion with you at this Office on 7th August, we send you herewith three copies of our report on the Ammonium Sulphate manufacturing scheme in Mysore State.

In submitting this report we should like to mention that notwithstanding the fact that new synthetic Nitrogen enterprises in general must necessarily be considered against a background of world over-production, we recognise that in certain localities local factors may exist which are of sufficient importance to justify special consideration. Our examination of the Mysore proposals has accordingly been made purely on the merits of the case without taking into account either our own interest or the economic problems raised in considering the matter in its wider aspects.

You will note that so far as it has been possible to base our estimates on the information obtainable here, the proposal to manufacture on the scale indicated would appear to be

highly uneconomic, unless a very considerable reduction in raw material costs is found to be possible or a substantial increase takes place in the price of imported Sulphate of Ammonia - an eventuality which as you are aware is exceedingly remote. As we indicated to you during your visit, however, we cannot claim that the report is exhaustive, seeing that there are still a number of points which it may not be possible to establish finally without local investigation, and we therefore confirm the offer which we made to you, namely, that if the Mysore Government so desires, we should be prepared to arrange at our own expense for a further technical enquiry to be made locally.

We must also add that although in order to make our report as comprehensive as possible we have included estimates showing what might be done by means of plant purchased from the cheapest possible source, i.e. Japan, it should be understood that for the reasons given in the report itself we could not recommend such a scheme as a satisfactory alternative, seeing that from the point of view of reliability and length of life there would in our opinion be no comparison between a plant manufactured in Japan and one manufactured in England, even if a "prima facie" case existed to show that the former was likely to prove an economic proposition.

In conclusion, may we again express the pleasure which it gave us to see you here on 7th August and the hope that that visit will be the forerunner of many friendly contacts in the future.

Yours faithfully,

For IMPERIAL CHEMICAL INDUSTRIES LTD.
Overseas Sales Department.

15

IMPERIAL CHEMICAL INDUSTRIES LIMITED

FERTILIZER AND SYNTHETIC PRODUCTS GROUP
BILLINGHAM

REPORT ON THE ECONOMICS OF A PROJECT TO ERECT A SYNTHETIC AMMONIUM SULPHATE FACTORY IN MYSORE TO PRODUCE 7,000 TONS PER YEAR OF AMMONIUM SULPHATE.

BILLINGHAM, CO DURHAM.

August, 1936.

REPORT ON THE ECONOMICS OF A PROJECT TO ERECT A SYNTHETIC AMMONIUM SULPHATE FACTORY IN MYSORE TO PRODUCE 7,000 TONS PER YEAR OF AMMONIUM SULPHATE.

I. INTRODUCTION.

This report is written in reply to a request from Imperial Chemical Industries (India) Ltd., for a report on the economics of a proposal to manufacture synthetic ammonium sulphate to meet local requirements in the State of Mysore, estimated at about 7,000 tons per year. A request was received later to investigate the possibility of making the following additional products:-

Vitriol	-	300 tons per year
Copper sulphate	-	300 tons per year
Magnesium "	-	100 tons per year
Ferrous "	-	100 tons per year

Since the profits to be gained by making these small amounts of by-products cannot have any important effect on the economics of the ammonium sulphate factory, the costs of the simple ammonium sulphate factory will be examined without reference to the manufacture of the byproducts, the costs of which will be examined in a separate section of the report.

II. WORKING COSTS.

While the capital cost of the factory erected in Mysore cannot be estimated with any great accuracy until it is known where the machinery etc. would be bought, the running costs, excluding any charges for capital, can be assessed with considerable accuracy since the quantities of raw materials required are fixed and their prices can be estimated without great error.

The works running costs have been calculated for a factory making 7,000 tons per year of ammonium sulphate from:

(a) coke and pyrites, and
(b) electrolytic hydrogen and pyrites.

In making the calculations the following assumptions have been made:

Exchange.

All costs have been translated to British currency at the rate of Re.1 = 1/6d.

Coal.

Bengal coal is quoted as available in Mysore at 36 sh./ton.

Coke.

Based on the price of coal, a price of 40 sh./ton has been assumed (the use of charcoal instead of coke has been suggested, but on the price quoted for wood it is very unlikely that charcoal will be any cheaper than coke).

Pyrites.

Based on the scanty information available, a price of 35 sh./ton c.i.f. Madras has been assumed, for pyrites containing 45% sulphur. Carriage from Madras to Mysore is quoted at £1/ton, making the total cost of pyrites at the factory £2.75/ton. (It is possible that sulphur will be cheaper than pyrites, for the manufacture of sulphuric acid in Mysore, but only if the price of pyrites is higher than 35 sh./ton).

Bags.

The cost of 2 cwt. jute bags is assumed to be 5.5d each.

Other Materials.

This heading includes catalysts, lubricants, and various chemicals.

Power.

The cost of electric power for the coke process, with a steady load of some 620 K.W. is given as 0.5d/KWH. The cost of power for the electrolytic process,with a steady load of some 3,400 K.W.,is given as 0.1d/KWH.

Water.

A supply of clean, fresh water (from a stream or river) is required at the rate of 20 tons/hour, and is assumed to cost 0.5d/ton.

Labour.

The rates of pay of the three classes of labour and staff have been taken as quoted to I.C.I.. It has been assumed that one European foreman per shift will be employed.

Maintenance.

Approximately two-thirds of the cost quoted will be expended on material, and one-third on wages of skilled workmen.

Supervision.

A figure of £2,000/year has been assumed.

Works General Charges.

This heading covers a number of general items of cost such as stationery, clerks, traffic inside the works, workmen's insurance, and cleaning of the factory site.

The works running costs obtained in this way are shown in Table 1. It is evident that the running cost exceeds £7 per ton of ammonium sulphate before any allowance is made for obsolescence of plant, interest on capital, taxes, insurance of plant, selling expenses, etc.

T A B L E 1.

WORKS RUNNING COST FOR MANUFACTURE OF 7,000 TONS PER YEAR OF SULPHATE BY (a) COKE PROCESS AND (b) ELECTROLYTIC PROCESS.

	Quantity and Cost.	(a) Coke Process		(b) Electrolytic Process	
		Total Annual Cost. £.	£/ton Sulphate	Total Annual Cost. £.	£/ton Sulphate
MATERIALS.					
Coke	3,010 tons @ 40/- per ton	6,020	0.9	-	
Coal	1,260 tons @ 36/- per ton	2,270	0.3	-	
	400 tons @ 36/- per ton	-		720	0.1
Pyrites	4,450 tons @ 55/- per ton	12,250	1.75	12,250	1.75
Bags for Sulphate.	70,000 @ 5.5d ea	1,600	0.2	1,600	0.2
Other Materials.		1,600	0.2	1,230	0.2
SERVICES.					
Power	4,060,000 KWH. @ 0.5d/KWH.	8,460	1.2	-	
	25,620,000 KWH. @ 0.1d/KWH.	-		10,670	1.5
Clean Water	120,000 tons @ 0.5d/ton.	250		250	
LABOUR.					
Foremen	3 @ £600/year.	1,800		1,800	
Scientific Staff.	6 @ £120/year	720		720	
Trained Operatives.	84 @ £80/year	6,720		6,720	
Unskilled Labourers	15 @ £20/year	300		300	
Total labour cost.		-	1.4	-	1.4
MAINTENANCE.		9,000	1.3	8,000	1.1
SUPERVISION.		2,000	0.3	2,000	0.3
WORKS GENERAL CHARGES.		5,000	0.7	5,000	0.7
TOTAL WORKS RUNNING COST, PACKED AT FACTORY.		£57,990	£8.3	£51,260	£7.3

III. CAPITAL COSTS AND CAPITAL CHARGES.

In order to obtain the complete manufacturing cost of ammonium sulphate, it is necessary to add to the factory running costs the appropriate charges for obsolescence, taxation, and insurance of plant, and interest on capital, all of which depend upon the capital cost of the plant.

Table 2 shows the estimated capital cost of the plant (excluding certain unknown items such as purchase and levelling of site, connection to the main railway system, etc., but including stocks and starting-up expenses, and interest during construction), required for:

(a) the coke process, and
(b) the electrolytic process,

if the plant were purchased

(1) in England, or
(2) in Japan,

and transported to, and erected in, Mysore. The cost of the plant purchased in England shows the cost of a plant of the highest quality, and completely equipped. The cost of the plant bought in Japan has been included in order to show the lowest possible price at which a synthetic ammonium sulphate plant could be erected. It is known that a factory can be erected in Japan, with plant manufactured wholly in Japan, at a cost which is only one-third to one-half of the cost involved in the erection of a factory in England with plant manufactured in England, but the quality of the Japanese plant is probably inferior, and it is likely to require heavier repair costs, and will become obsolete sooner, than the English plant.

In order to calculate the capital charges for the complete manufacturing cost, the following allowances have been made:-

(i) obsolescence is charged at $7\frac{1}{2}\%$ per annum on English plant, and 10% per annum on Japanese plant,

(ii) taxation and insurance are charged at a total of 1% per annum,

(iii) interest on capital is charged at 5% per annum.

These calculations have been shown in Table 2.

TABLE 2.

CAPITAL COSTS & CAPITAL CHARGES

	English made plant.		Japanese made plant.	
	Coke process	Electrolytic process	Coke process	Electrolytic process
	£	£	£	£
Capital cost of complete plant erected in Mysore	415,000	430,000	150,000	160,000
Obsolescence at 7½%	31,100	32,200	-	-
" " 10%	-	-	15,000	16,000
£/ton sulphate	4.4	4.6	2.1	2.3
Taxes & Insurance @ 1%	4,200	4,300	1,500	1,600
£/ton sulphate	0.6	0.6	0.2	0.2
Interest on Capital @ 5%	20,700	21,500	7,500	8,000
£/ton sulphate	3.0	3.1	1.1	1.1

IV. TOTAL MANUFACTURING COST OF AMMONIUM SULPHATE.

An approximate estimate of the total manufacturing cost of ammonium sulphate, under various conditions, can now be made, see Table 3.

TABLE 3.

TOTAL MANUFACTURING COST OF 7,000 TONS PER YEAR OF AMMONIUM SULPHATE.

	English made plant.		Japanese made plant.	
	Coke process	Electrolytic process	Coke process	Electrolytic process
	£/ton sulphate	£/ton sulphate	£/ton sulphate	£/ton sulphate
Works running cost (from Table 1.)	8.3	7.3	8.3	7.3
Obsolescence (from Table 2)	4.4	4.6	2.1	2.3
Taxes & Insurance (from Table 2)	0.6	0.6	0.2	0.2
Interest on Capital (from Table 2)	3.0	3.1	1.1	1.1
TOTAL MANUFACTURING COST, PACKED AT FACTORY.	16.3	15.6	11.7	10.9

V. MANUFACTURE OF BY-PRODUCTS.

Vitriol (300 tons per year).

77% H_2SO_4 will be made, at the rate of 7,000 tons per year, for the manufacture of ammonium sulphate, so that 300 tons per year will be available for sale. The total manufacturing cost, naked at factory, will be £2.7 per ton of 77% H_2SO_4.

Copper Sulphate (300 tons per year).

This can be made from scrap copper (assumed to cost £45 per ton in Mysore) and from sulphuric acid. The capital cost of the plant will be £4,000 (English made) and the total manufacturing cost, packed at factory, will be £16 per ton (Copper sulphate can be bought in England at £15 per ton).

Magnesium Sulphate (100 tons per year).

This can be made from magnesite and from sulphuric acid. There are abundant supplies of magnesite at Salem, in Madras, and it is assumed that this material could be delivered in Mysore at £1 per ton. The capital cost of the plant will be £1,250 (English made) and the total manufacturing cost, packed at factory, will be £5 per ton. (Magnesium sulphate can be bought in England at £5 per ton).

Ferrous Sulphate (100 tons per year).

This can be made from scrap iron (assumed to cost £2 per ton in Mysore) and sulphuric acid. The capital cost of the plant will be £1,250 (English made) and the total manufacturing cost, packed at factory, will be £5 per ton. (Ferrous sulphate can be bought in England at £2-4 per ton).

VI. CONCLUSIONS.

The price of imported ammonium sulphate, f.o.r. Mandya, is at present £7.5 per ton, and no reason can be adduced for expecting any substantial variation of this price, either upwards or downwards. In Section IV of this report it is shewn, from the information about prices of raw materials at present available to I.C.I., that it will be impossible to make sulphate in Mysore at a price lower than £11 per ton (exclusive of overheads charges such as directors' fees). If the quantities of by-products, mentioned in Section V, are also made at the factory, and can be sold to realise as high a profit as £10 per ton, and if this profit be utilised to reduce the manufacturing cost of ammonium sulphate, the cost of ammonium sulphate made in Mysore could be reduced to £10 per ton. Reference to Table 1 shows that a substantial reduction in works running costs could be achieved only by reducing the costs of:

(a) raw materials,
(b) labour, and
(c) works general charges,

but no information is available to I.C.I. to suggest that such reductions could be made. The capital charges shown in Table 2 (page 5) are a minimum for a properly financed concern, and cannot be reduced.

It is therefore concluded that manufacture of ammonium sulphate in Mysore cannot be economic, the reasons for this failure being:

(a) the small output required, and

(b) the high costs of raw materials which have to be imported over long distances.

BILLINGHAM, CO. DURHAM.
AUGUST, 1936.

W.G.D.

21.

C.D. Priestley.

IMPERIAL CHEMICAL INDUSTRIES (INDIA), LTD.

SPRINGHAVEN ROAD (SOUTH),
THE HARBOUR,
MADRAS.

1st October 1936.

Dear Mr. Venkatanaranappa,

Further to my letter of the 15th September, I now learn that I.C.I.Ltd., wrote to the Dewan handing him three copies of their report on the Nitrogen Fixation scheme in Mysore on the 18th of August, and I have only just received a copy of this report and the letter which accompanied it.

In view of the contents of this report and the fact that the Dewan has now returned from Europe and will have handed you one of his copies, I am not visiting you ~~yet~~ in order to present the report in person as I originally contemplated.

The arrangement is that your Government should examine this report and the figures, and if you are not satisfied with this preliminary report, I.C.I. are willing to go into the matter further in accordance with the offer they made to Sir Mirza when he was in London. Presumably it will take some little time for this report to be examined, and if at any time it is your wish to see me in connection with this matter, will you please write, and I will try and come up at once. In the meantime, owing to staff difficulties, I have decided not to visit Mysore as usual during the Dasrah festivities, but to wait until the first week of November, by when I expect you and all the other senior officials will have returned from Mysore and taken up your duties in Bangalore.

Yours sincerely,

C.D. Priestley

M. Venkatanaranappa, Esq.,
Development Secretary to Government,
Bangalore.

Dear Sir,

I am in receipt of your letter of May 18 with three copies of your Report on the Scheme for Municipalities of Symonia Suspected in Her State, and ~~immediately~~ on my return to May celebrate to thank you for them and to express my apologies for the delay in acknowledging their receipt, I was ~~away~~ busy all this day and could not, therefore, write to you earlier.

I note your conclusion that the execution of a Symphetic Symonian Symphetic Party in ~~Symonia~~ Symonia is not in the circumstances mentioned in the report an economic proposition. I have perused that a closer and local investigation may disclose that the prospects are not offtrack so gloomy as I should have thought. I shall have the pleasure of forwarding further communications to you, if necessary, in due course.

With my cordial appreciation of your assistance and co-operation I remain

Yours

C.D. Priestley

IMPERIAL CHEMICAL INDUSTRIES (INDIA), LTD.

17 SPRINGHAVEN ROAD (SOUTH),
THE HARBOUR,
MADRAS.

7th October 1936.

12 NOV. 1936

DEVELOPMENT BRANCH

Dear Sir Mirza,

Thank you for your letter of the 3rd October and I will defer my visit to a later date which would be convenient both to you and me. I do not, however, wish to leave my visit over too late, because I am sailing for England on Home leave during the third week of November. I shall write to your Private Secretary at Mysore at the end of this month, enquiring about when you expect to get back to Bangalore.

Yours sincerely,

C.D. Priestley

Amin-ul-Mulk Sir Mirza M. Ismail, Kt., C.I.E., O.B.E.,
Dewan of Mysore,
Bangalore.

18

D.O. letter dated the 8th October 1936 from the Dewan of Mysore to Messrs The Imperial Chemical Industries, Limited, Overseas Sales Department, Millbank, London.

-----:O:-----

I am in receipt of your letter of August 18 with three copies of your report on the scheme for manufacture of Ammonium Sulphate in the State, and on my return to Bangalore I hasten to thank you for them and to express my sincere apologies for the delay in acknowledging their receipt. I was very busy all these days and could not, therefore, write to you earlier.

I note your conclusion that the erection of a Synthetic Ammonium Sulphate Factory in Mysore is not, in the circumstances mentioned in the report an economic proposition. I hope, however, that a closer local investigation may disclose that the prospects are not after all so gloomy. I shall have the question further examined and write to you again, if necessary, in due course.

With my cordial appreciation of your assistance and co-operation and with all good wishes for your prosperity.

Yours sincerely,

Sd/- Mirza M. Ismail,

" Copy "

10/10/36

No.624

Bangalore,
8th October 1936.

Dear Sirs,

I am in receipt of your letter of August 18 with three copies of your report on the scheme for manufacture of Ammonium Sulphate in the State, and on my return to Bangalore I hasten to thank you for them and to express my sincere apologies for the delay in acknowledging their receipt. I was very busy all these days and could not, therefore, write to you earlier.

I note your conclusion that the erection of a Synthetic Ammonium Sulphate Factory in Mysore is not, in the circumstances mentioned in the report an economic proposition. I hope, however, that a closer local investigation may disclose that the prospects are not after all so gloomy. I shall have the question further examined and write to you again, if necessary, in due course.

With my cordial appreciation of your assistance and co-operation and with all good wishes for your prosperity,

Yours sincerely,

(Sgd) M. V.

Messrs The Imperial Chemical Industries, Ltd.,
Overseas Sales Department,
Millbank,
LONDON, S.W.1.

Manufacture of Sulphuric Acid

479

General and Revenue Secretariat | File No. | of 193 | [App. F. III—2

Serial No.

From the Director of Pcs
Do Letter No D5/36-37 dy 11.11.36
Printed copy of letter dy 17.8.36
with its enclosure received from
Dr P. Krishnamurti of the Indian
Institute of Science on the above
subject

Subd for perusal
The papers on the subject received
from the Dewan's office - Correspondence
with Mr Priestley - are also submitted
by CE (My bill, if approved, be put to Secy,
14/12/36 Board of Pcs, after perusal)

For perusal Another file of
papers received in the Dewan's
office regarding the erection of
a Synthetic Ammonium Sulphate
Factory in Mysore is
issued with this.

by
Secy 15.11.36

MW.
4.12.36.

4.12.36

Subd.

For orders. If these papers may be submitted to
Secretary Member,
Does not seem to be
necessary. He is away at
Calicut now. 5.12.36

3524/36/11

NOTE—Contn. Sheet. WD 0417—GPB—30,000—8-9-26

Secy 1/1/37

DATE OF DELIVERY 9 DEC. 1936

DATE OF RETURN 4/1/37

GOVT. CENTRAL PRESS

Tel.: "INDUSCOM"

DEPARTMENT OF INDUSTRIES AND COMMERCE.

OFFICE OF THE DIRECTOR,

Mr. S.G. Sastry, B.A.,M.Sc.,F.C.S.
Director.

Bangalore, dated the 11th November *1936*.

D. O. No. D- 36/37

2479
12 NOV 1936

Dear Mr. Venkatanaranappa,

Manufacture of Sulphuric Acid in the Mysore State.

I send herewith for your information a copy of letter dated 17th August 1936 together with a copy of its enclosure received from Dr.P. Krishnamurti,M.A.,D.Sc.,Indian Institute of Science, on the above subject.

Yours sincerely,
S Sastry

M.Venkatanaranappa, Esq.,B.A.,
Secretary to the Government of Mysore,
Development Department, Bangalore.

Subd for perusal
12/11/36 (with the previous Sub Committee papers)

Letter dated 17th August 1936 from Dr.P.Krishnamurti,M.A. D.Sc.,Indian Institute of Science,Bangalore to Mr. A.V.Ramanathan,. Development Commissioner, Bangalore.

I enclose herein for your kind perusal a short note stating the position about Sulphuric acid. I have not attempted to get data regarding the total consumption of the various acids, fertilisers,etc. in Mysore State and this could no doubt be available in the Industries Department.

We are manufacturing Thorium Nitrate at the Bangalore Chemical and Manufacturing Co.,Ltd., but experience much difficulty on account of the high cost of acids. We have now to import our sulphuric acid requirements (about 2 tons per month) from Japan. This and other acids derived from it form the chief cost of our Thorium nitrate and unless they could be obtained at reasonable prices, we cannot compete sucessful-ly with the imported material.

I shall therefore be much obliged if you could kindly give the matter of establishing a local factory for the manufacture of sulphuric acid your sympathetic consideration.

"Copy"

Director.

PSS.

Sulphuric acid manufacture in Mysore State.

It is well known that sulphuric acid among acids and soda ash among alkalies take a leading place in any country's chemical manufactures. There are as few factories in India for the manufacture of sulphuric acid but most of them are situated in northern India and there is only one in South India, viz, Messrs. Parry and Co., at Ranipet. Imported sulphur is the raw material from which the acid is manufactured in all the existing factories. The lead chamber process prevails in all the factories except in the recently constructed works of the Tata firm which uses the Vanadium Contact Catalytic process.

In most European Countries and in Japan, sulphuric acid is a by-product in zinc smelter works and hence is available at very cheap prices, viz, Rs 40 to 50 per ton of 100% H_2SO_4. Most of this acid, which could be safely transported in acid-proof steel drums is to some extent marketed into India. The insurance and freight charges amount to Rs 50/- per ton, and hence the total cost per ton at any of the Indian ports would amount to Rs 100/- per ton. On this a duty of 30% has to be paid. For a consumer in Bangalore, the acid has to be sent by rail from Madras and the freight charges amount to Rs 32/- per ton. So, the total cost of 1 ton of sulphuric acid by the time it reaches the hands of the consumer swells up to Rs 160 - 170 per ton or roughly about four times the price prevailing in Europe or in Japan.

With regard to the acid made in other parts of India, since railway freight is enormous, there is no likelihood of any supply reaching Mysore State from these sources. The only other source from which the acid will be available will be the works of Messrs. Parry and Co at Ranipet. There is however no advantage in price to the consumer as the price of the acid is not lower than that of the imported acid.

It will be clear from the above that if industrial enter-

enterprises in Mysore State are to be promoted, cheap sukphuric acid should be made available to them with their products are to compete with foreign made materials. This is specially the case with the indigenous manufacture of fine and heavy chemicals. As Sulhuric acid forms the basis of such industries, a person in India who has to pay four times the cost of the acid prevailing elsewhere is no doubt at a great disadvantage and the chemical industry cannot stand competition.

A sulphuric acid factory if started in Mysore State will not only serve to meet the demands of local consumers, the mills, various chemical factories, etc. for their requirements of sulhpuric acid, but also for the preparation of hydrochloric acid, Nitric acid, ammonium sulphate, magnesium sulphate, superphosphate, Turkey Red oil, etc. which require sulphuric acid. Numerous other small industries exist to which the supply of cheap acids will become a great boon and which at present either import or purchase their requirements at great cost paying enormous railway freight. A cheap local supply of acids would enable them to cut down their cost of production and enable them to compete successfully with the finished products imported from abroad.

It will be clear from the above that if industrial enter-

Director.

THE TATA IRON & STEEL CO.,LTD.

14-7-1936.

All-in-Cost for 1935-36.

		Rs.lakhs.
Bombay, Calcutta and Tata Limited's expenses and Agents' Commission.	...	14.88
Interest on Working Capital.	...	15.28
Depreciation ...	...	78.00
Total.		Rs. 108.16

Column I shows works cost for 1935-36.
" II " " " with overhead charges and depreciation added, to the total being Rs.108.16 lakhs.

	Column I Rs.Per Ton.	Column II Rs.Per Ton.	Remarks
Sulphuric Acid ...	37.11	47.37	
Coke Ovens ...	8.19	9.60	
Coal Tars ...	4.19	6.58	
Sulphate of Ammonia ...	50.28	69.99	
Blast Furnaces ...	17.69	20.91	
Ferro Manganese ...	64.22	77.00	
Open Hearth ...	35.63	40.41	
Bessemer Converters ...	21.94	26.35	
Duplex Plant ...	31.63	38.87	
Average cost of Ingots.	32.96	39.38	
Blooming Mill ...	38.17	46.78	
Sheet Bar & Billet Mill	41.41	51.81	
New Rail Mill ...	55.43	73.53	
Old Bar Mill ...	77.30	96.06	
Merchant Mill ...	52.23	66.58	
Plate Mill ...	64.72	87.26	
Black Sheets ...	74.39	95.73	
Galvd.Plain Sheets. ...	102.82	126.86	
" Corrugated Sheets	106.29	131.27	
Sleepers	58.84	74.13	